

FIRST RECORD IN THE MEDITERRANEAN (NORTH AEGEAN SEA, GREECE) OF THE PACIFIC MULLET *MUGIL SOIUY* BASILEWSKY, 1855 (MUGILIDAE). Emma-nuil Theodore KOUTRAKIS, National Agricultural Research Foundation, Fisheries Research Institute of Kavala, GR-640 07 Nea Peramos, Kavala, & Panos Stavros ECONOMIDIS, Aristotle University, School of Biology, Laboratory of Ichthyology, Box 134, GR-540 06 Thessaloniki, GREECE. [PSEcon@bio.auth.gr]

RÉSUMÉ. - Première capture en Méditerranée (Mer Égée du nord, Grèce) du muge du Pacifique, *Mugil soiuy* Basilewsky, 1855 (Mugilidae).

Le muge du Pacifique, *Mugil soiuy* Basilewsky, 1855, ou *Liza lauvergnii* (Eydoux & Souleyet, 1841), est signalé dans le nord de la mer Égée grâce à la capture de quatre spécimens de plus de 45 cm LT, dans le lac-lagune Ismarida, la rivière Evros et la mer de Thrace. Ces captures représentent le premier signalement de ce poisson du Pacifique dans la Méditerranée. Il est probable que les spécimens proviennent de piscicultures de la mer Noire (ex. URSS) où l'espèce a été introduite depuis 1972. Elle est arrivée dans le nord de la mer Égée (mer de Thrace) en migrant le long des côtes occidentales de la mer Noire, du Bosphore, de la mer de Marmara et du détroit des Dardanelles.

Key words. - Mugilidae - *Mugil soiuy* - *Liza lauvergnii* - MED - Aegean Sea - First record.

Mugilidae is a widely distributed family in the tropical, subtropical and temperate zones. They are euryhaline fish and are found more commonly in coastal waters and lagoons than in fresh waters, where some of them regularly penetrate for feeding. Members of this family make up an important and one of the most distributed commercial fishery in the world's coastal waters. In the North-eastern Atlantic and the Mediterranean area eight mullet species occur (Ben-Tuvia, 1986), from which seven in the Mediterranean (Ben-Tuvia, 1975; Bauchot, 1987) and six in the Aegean (Economidis, 1973; Economidis and Bauchot, 1976). These are *Mugil cephalus* Linnaeus, 1758, *Chelon labrosus* (Risso, 1826), *Liza ramada* (Risso, 1826), *L. aurata* (Risso, 1810), *L. saliens*

(Risso, 1810) and *Oedalechilus labeo* (Cuvier, 1829). Additionally, *Liza carinata* (Valenciennes, 1836) occurs only in the South-eastern Mediterranean (Ben-Tuvia, 1975; Bauchot, 1987) and *Mugil capurii* (Perugia, 1892) in the Atlantic coasts of Morocco (Ben-Tuvia, 1986). The presence of the *Mugil soiuy* Basilewsky, 1855 or *L. lauvergnii* (Eydoux & Souleyet, 1841), originally distributed in the coasts of NE Asia from Vladivostok to Macao (Thomson, 1997), has added one more exotic species to the fish fauna of the Mediterranean.

Methods

Meristic and morphometric characters follow Grant and Spain (1975), Oren (1981), Holcik *et al.* (1989) and Thomson (1997), and maturity stages are after Nikolsky (1963).

Results

In 1995, a fisherman caught a mugilid fish of unusual colour and shape (large scales, sharp snout and a yellowish colour) in the lake Ismarida, which is located near the shore of Greek Thrace and which communicates with the sea through a 3 km channel. This specimen arrived very late in our hands for scrutiny, and the difficult determination indicated that, according to Berg (1949), it was a *Mugil soiuy* Basilewsky, 1855. Some years later, information coming from the Thracian shores revealed the regular presence of this unknown fish, especially in freshwater, from river Evros to the river Nestos westwards (Fig. 1).

MUGIL SOIUY BASILEWSKY, 1855

Material

Four specimens were caught in the north-eastern watersheds of Thracian Sea (Fig. 1), as follows: one specimen, 522 mm TL, lake Ismarida, 1995 (poorly conserved); one male (maturity in stage III), 488 mm TL, 1,074 g total weight, lake Ismarida, 5 Jan. 1998; one male (maturity stage III), 567 mm TL, 1,367 g total weight, river Evros, 21 Feb. 1998; one specimen, 606 mm TL, 2,286 g total weight, Thracian Sea near the shoreline village Fanari. Meristic and morphometric characters are shown in table 1. These specimens (uncatalogued) are preserved in the Fisheries Institute of Kavala.

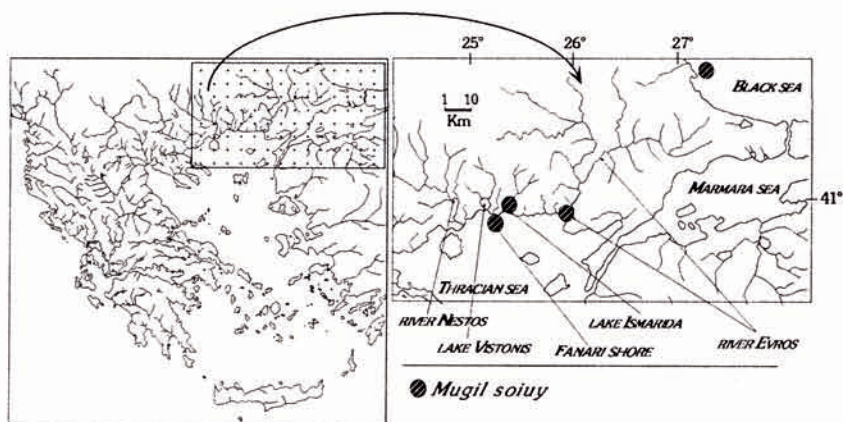


Fig. 1. - Map of the marine region of Thracian shores showing the localities where the specimens of *Mugil soiuy* were caught.



Fig. 2. - *Mugil soiuy*, male, 493 mm TL, lake Ismarida, 5 Jan. 1998.

Description

D₁: IV; D₂: I + 8; A: III + 8-9; scales ctenoid without denticulation, some with a mucus canal; scales in lateral series (from pectoral fin origin to the end of hypural plate): 40-43; pyloric caeca: 6; body elongate slender; head pointed, flattened on top, its length at 23-24% of standard length; scales free to just before anterior nostrils; thin adipose eyelid (25-30% of the head length, covers small part of the iris). Upper lip median high, reaching half of the eye diameter and smooth (without tubercles and pupillae); large symphyseal knob at front of lower jaw. Teeth very small, hardly visible; two rows of unicuspid teeth at the edge of the upper lip; no teeth on vomer or palatine, but teeth on tongue. Maxilla tip curved down at corner of mouth and still visible when mouth closed; mouth corner on vertical just in front of posterior nostril; nostrils nearer each other than lip

of eye. Pectoral fin short not reaching first dorsal fin origin, its length is less than 25% of head length with no axillary scale. Pelvic fin tip reaching vertical at base of spine 3 of first dorsal fin, with axillary scale reaching half along pelvic fin. First dorsal fin origin nearer to snout tip than caudal base, with axillary scale reaching half along membrane behind of spine 4. Second dorsal fin origin behind vertical from origin of anal fin. Slightly emarginate caudal fin (Fig. 2).

Discussion

The above description of the examined specimens from Thracian coastal area, puts them in the genus *Liza* rather than *Mugil*. Consequently, using the complete description and the synonymy proposed by Thomson (1997) the specimens in our hands should be classified better as *Liza lauravergii* (Eydoux & Souleyet, 1841) than *Mugil soiuy*

Basilevsky, as it can be determined by using Berg (1949). However, in the present short note, dealing with the geographical extension of an alien species which appeared recently in North-eastern Mediterranean, the taxonomy which is used in the close related Black Sea, where the species is also alien (see Starushenko and Kazansky, 1996), is kept. Regarding the ecology of the species it can be noted that it shows a remarkable preference to the freshwater environment, regularly reaching upstream of many rivers which flow into the Pacific ocean (Japan Sea, Yellow Sea), around North eastern Asia (Berg, 1949). According to Starushenko and Kazansky (1996), the species has been introduced into brackish ponds at the Azov Sea in the late 1960s. Over the period 1972-80 this was followed by more transfers and releases of juveniles captured in the Gulf of St Peter at the Japan Sea. The species became rather common in lagoons of the Black Sea, where it was rapidly estab-

lished since it grows very fast and it is fished in large quantities by professional and recreational fishermen. In most cases it has replaced the stocks of the local mullets *Mugil cephalus*, *Liza aurata* and *L. saliens* (Starushenko and Kazansky, 1996).

The specimens caught on the Thracian shores of Greece (north Aegean Sea) most probably come from the Black Sea stock. An investigation by questionnaire, done among the local shore fishermen, those fishing in rivers and lagoons included (rivers Evros and Nestos, lake Ismaris and lagoon-lake Vistonis), has revealed that the fish has been caught in recent years, mainly in fresh waters. In addition, the fishermen talk about catches of only large mullets of 1-3 kg weight, which they believe to be an unknown hybrid, so they call it "bastard mullet" or "carp mullet". They sell them along with the other mullet species at a good price, since they are large fish. However, the local fish market does not seem to be influenced by

Table I. - Morphometric and meristic characters (in mm) of *Mugil soiuy* specimens caught in North Aegean Sea [after Grant and Spain (1975), Holcik *et al.* (1989) and Thomson (1997)]. *: Measurements in fresh specimens except from n°2 in which they were made in preserved specimen; **: The specimens 2, 3 and 4 are deposited in the fish collection of the Fisheries Research Institute of Nea Peramos (Kavala).

Specimen**	1	2	3	4
Date	1995	5/01/98	21/02/98	19/03/98
Location	lagoon Ismarida	lagoon Ismarida	river Evros	Thracian Sea
Sex	?	male	?	male
Morphometric characters *				
Total length	522	488	567	606
Standard length	452	411	482	502
Fork length		469	546	578
Predorsal 1 distance		187	219	235
Predorsal 2 distance		305	365	377
Preanal distance		293	349	367
Preventral distance		147	178	182
Body depth		92	?	112
Head length		96	111	121
Upper lip high	7.5	7	8	7.2
Eye diameter	11.5	12	13.8	13.5
Adipose eyelid length/gap		29/11.0	30/10.5	31/12.0
Meristic characters				
Scale rows		40	43	42
First dorsal rays		IV	IV	IV
Second dorsal rays		I/8	I/?	I/8
Anal rays	?/9	II/8	III/?	III/9
Pectoral rays number / length		14/65	14/74	14/83
Pyloric caeca	6	6	?	6

these few captures yet. There are no information, samples and/or observations on the natural reproduction of the species in the area. It is unusual that everybody speaks about fish of more than 50 cm TL long. This means perhaps that only large fish could have travelled from the Black Sea and entered the estuaries and fresh waters of the north Aegean Sea. An alternative explanation could be that the species has already been adapted and reproduces in the area, but neither mature female specimens or juveniles have been yet observed.

The influence of this introduction on the other Mediterranean mullets is still unknown. It is premature to say whether this species has already been permanently established in Mediterranean waters. However, as it is a high adaptable fish, which feeds mainly on detritus, tolerates a wide range of salinity and water temperature and is also able to winter in cold waters, including estuaries (Starushenko and Kazansky, 1996), this contingent cannot be excluded. Moreover, it is almost certain that if a good population is established in the Mediterranean flowing fresh waters, it will compete with and maybe replace the other five mullet species or other indigenous freshwater species.

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